cultural Experiment Station in Kodiak were collected.[2] The samples here described were submitted to this bureau through the Office of Experiment Stations and a mineralogical examination of them was made.

Sample No. I. is light in color and rather coarse. It represents the first fall, which reached a depth of about six inches. There are present indeterminable feldspars, a slight amount of muscovite and a few apatite inclusions. Glass constitutes the larger part of the mass. The refractive index of this glass is below 1.50, thus indicating that the silica content is above 72.65 per cent.

Sample No. II. represents the second fall which reached about three or four inches in depth. It is reddish in color. The minerals present are hornblende, indeterminable feldspars, and biotite. Glass with the refractive index below 1.50 predominates. Some of the glass particles, however, had an index above 1.50. Obviously the material in the second fall is more basic than that of the first fall.

Sample No. III. represents the last fall, is light in color and very finely divided. Indeterminable feldspars, muscovite, and a few indeterminable particles of what appear to be some ferro-magnesian mineral are present. Glass with index below 1.50 predominates. Apparently the material in the last fall is between the first and second as regards basicity, *i. e.*, chemical composition.

These three mineralogical analyses indicate that the ashes were derived from a magma agreeing fairly well in composition with a granite magma. The silica content of three granites taken more or less at random from Washington[3] are as follows: (1) 72.48 per cent., (2) 76.91 per cent., (3) 74.40 per cent. The refractive index of the glass in these falls at Kodiak shows a silica percentage greater than 72.65, which makes the glass of the samples correspond very nearly in silica content with granite. The silica content of three obsidians, also taken from Washington, are as follows: (1) 75.52 per cent., (2) 76.68 per cent., (3) 76.20 per cent. These also agree fairly well with the silica content of the glassy part of the ash.

The analyses also indicate that a partial differentiation had taken place in the magma. Sample No. II. contains both hornblende and biotite which are not present in sample No. I. Moreover the index of some of the glass particles in No. II. indicates a lower silica content than is the case of the glass of the first and third falls.

As compared with ordinary soil material these falls are distinguished mainly by the high content of glass. There is every reason to anticipate that these glasses, as well as the definite minerals, would dissolve, hydrolize, and behave as would ordinary soil minerals. In fact the glasses would probably react with the soil water more rapidly than crystalline components of the soil.

No substances deleterious to plant growth were revealed by the examination, and on the whole these falls will probably serve ultimately as an enrichment of the preexisting soil, although it by no means follows that the immediate effects will be satisfactory.

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[2] For a general description of this eruption see "Volcanoes of Alaska," *The National Geographic Magazine*, Vol. XXIII., p. 824, 1912.

[3] U. S. Geol. Surv., Professional Paper 14, 1903.

SOCIETIES AND ACADEMIES

THE AMERICAN MATHEMATICAL SOCIETY

The one hundred and sixtieth regular meeting of the American Mathematical Society was held at Columbia University on Saturday, October 26, extending through the usual morning and afternoon sessions. Fifty-two members were in attendance. Among those present were Professors Emile Borel, of the University of Paris, and Vito Volterra, of the University of Rome.

Vice-president Taber occupied the chair. The council announced the election of the following persons to membership in the society: Dr. Henry Blumberg, Brooklyn, N. Y.; Mr. J. M. Colaw, Monterey, Va.; Dr. F. M. Morgan, Dartmouth College; Dr. Louis O'Shaughnessy, University of Pennsylvania; Dr. C. T. Sullivan, McGill University.

Luncheon was served at the university. In the

evening sixteen members gathered at the usual dinner.

The following papers were read at this meeting:

H. W. Reddick: "Systems of plane curves whose intrinsic equations are analogous to the intrinsic equation of an isothermal system."

L. L. Dines: "Note concerning a theorem on implicit functions."

L. L. Dines: "Singular points of space curves defined as the intersections of surfaces."

E. T. Bell: "On Liouville's theorems concerning certain numerical functions."

E. T. Bell: "The representation of a number as a sum of squares."

G. R. Clements: "Implicit functions defined by equations with vanishing Jacobian. Supplementary note."

Edward Kasner: "Note on contact transformations of space."

E. H. Taylor: "An extension of a theorem of Painlevé."

L. S. Dederick: "On the character of a transformation in the neighborhood of a point where its Jacobian vanishes."

Vito Volterra: "Some integral equations."

W. F. Osgood: "Proof of the existence of functions belonging to a given automorphic group."

G. D. Birkhoff: "Proof of Poincaré's geometric theorem."

E. V. Huntington: "A set of postulates for abstract geometry in terms of the simple relation of inclusion."

Dunham Jackson: "On the degree of convergence of related Fourier series."

A. A. Bennett: "Note on the solution of linear algebraic equations in positive numbers."

The San Francisco Section of the society held its regular fall meeting also on October 26 at the University of California. The regular meeting of the Southwestern Section will be held at the University of Kansas on November 30. The annual meeting of the society, including that of the Chicago Section, will be held at Cleveland, Ohio, December 31 to January 2.

F. N. COLE,
Secretary

THE BOTANICAL SOCIETY OF WASHINGTON

A SPECIAL meeting of the society was held September 18, 1912, in honor of Professor Hugo de Vries, of the Hortus Botanicus, Amsterdam, who addressed the Society on "The Future of Plant Breeding as related to Agricultural Production." At the close of the address brief appreciative remarks were made by Professor W. M. Hays, Dr. E. F. Smith, Professor W. J. Spillman and Mr. F. V. Coville.

The 82d regular meeting was held at the Cosmos Club, Thursday, October 17, 1912, at 8:00 P.M., Mr. C. S. Scofield, president *pro tem.*, presiding. Nineteen members were present. Mr. W. H. Lamb, of the Forest Service, was elected to membership. The following papers were read:

The Cotton of the Hopi Indians: F. L. LEWTON.

This paper will be published in full in Smithsonian Miscellaneous Collections, Vol. 60, No. 6.

A Botanical Trip to the Sevier Forest, Southern Utah: W. W. EGGLESTON.

Damping-off of Coniferous Seedlings: C. P. HARTLEY.

With the exception of the cedars, damping-off of seedlings is a serious hindrance to the raising of conifer seedlings. Surfacing beds with gravel tends to decrease the trouble. The disease is generally worst under moist conditions, but a well-drained nursery in dry climate in southwestern Kansas has suffered especially heavy loss from damping-off parasites. No positive control method has ever been developed for general use.

In western porous soils damping-off is simply a root-rot of very young seedlings, which may attack at any point from the ground surface to several inches below. Seedlings several weeks old may have the younger parts of their roots rotted and yet survive.

Pythium debaryanum appears to be the most dangerous parasite in western nurseries. *Rhizoctonia* sp., *Fusarium* sp., and probably *Trichoderma lignorum*, also cause damping-off. *Pythium* and *Rhizoctonia* have been successfully inoculated on autoclaved soil; but inoculations do not succeed uniformly on unsterilized soil, due probably to competition of bacteria and other fungi. *Rhizoctonia* loses parasitism in culture and different strains vary greatly in virulence.

All active *Pythium* in nursery soil can be killed very cheaply by means of fungicides. Heat, and fungicides which break down soon after application, such as mercuric chloride, or acids and copper salts followed by lime, are not effective in the west, because *Pythium* often reinfects such disinfected soil, running through it rapidly before seedlings raised on it develop resistance. This reinfection at least sometimes takes place through the air, and is difficult to prevent under nursery conditions. Excellent results have been obtained by treating beds before seeding with sulfuric acid

and formalin, and on alkaline soils with zinc chloride and copper sulfate. These fungicides seem to leave a slight residue in the soil which protects reinfection. This protection sometimes fails. Rather complicated watering methods are necessary in the west to prevent chemical injury to the germinating seed by fungicides which leave residues. Further work is required to place any of the treatments on a firm economic basis.

The twelfth annual business meeting was held on Wednesday, October 30, 1912. Officers were elected as follows:

President—W. W. Stockberger.
Vice-president—C. R. Ball.
Recording Secretary—H. L. Shantz.
Corresponding Secretary—C. L. Shear.
Treasurer—F. L. Lewton.

The executive committee reported an active membership of 108.

W. W. STOCKBERGER,
Corresponding Secretary

THE AMERICAN PHILOSOPHICAL SOCIETY

AT the meeting of the American Philosophical Society, held October 4, 1912, a paper entitled "Some Tick-transmitted Diseases" was read by Professor G. H. F. Nuttall, M.D., Ph.D., Sc.D., F.R.S., of Cambridge, England. After referring to recent investigations dealing with the etiology of Rocky Mountain fever he gave a summary of our present knowledge of piroplasmosis in cattle, dogs, horses and sheep, and of certain differences exhibited by the parasites (*Piroplasma, Nuttallia, Thisleria,* etc.) causing the diseases grouped under the name of piroplasmosis. Spirochætal infections in man and animals were considered as well as the life cycle of the parasites (*Spirochætes*) in the bodies of the ticks which convey them to the vertebrate host. The economic importance of tick-transmitted diseases was pointed out.

On Restorations of North and South American Tertiary Mammals: W. B. SCOTT.

The method of making restorations of the external appearance of extinct mammals was first discussed, and it was pointed out that the popular idea concerning the feasibility of restoring an extinct form from a few scattered bones was entirely erroneous. Only skeletons that are practically complete can be employed to advantage. Given such skeletons, it is not difficult to build up the muscles, and thus to determine with much accuracy the general form and proportions of the animal. The uncertain factors of hair and color-markings were then considered, and it was shown that a reasonable approximation to the truth may be reached even in these matters. Lantern slides of some forty unpublished restorations of mammals from the Tertiary of North and South America were exhibited.

The following is an abstract of an address on "Electrons," given before the society at Philadelphia on Friday, November 1, by Sir William Ramsay, K.C.B., F.R.S.:

The actual existence of electrons in motion has been conclusively demonstrated; the mass of an electron is not far from one 1830th of that of an atom of hydrogen; and as the mass of an atom of hydrogen is now known with fair accuracy, that of an electron is nearly 0.8×10^{-27} gram. Electrons in motion *are* negative electricity; they constitute a form of matter, which, at present, has more claim to the term "elementary" than have most of the "elements." Indeed, metals must be regarded as compound bodies, of which one component consists of one or more electrons; these electrons are, as a rule, not very firmly attached, as is evident from the generally easy oxidation of most metals. Non-metals are also composed partly of electrons, not so easily detached. The "combination of elements with each other" consists in the shifting of one or more electrons from the more metallic to the less metallic element; no doubt it will some day be possible to give "structural formulæ" to the elements, showing the relationship in position, or in directed motion, between the true elements, and their attached electrons.

The word "electricity" has a dual meaning; it may mean first an assembly of electrons, stationary or in motion; or second, waves in the ether, produced by the stopping or starting of electrons in motion. The motion of electrons constitutes one factor of electrical energy; wave-motion in the ether can be used as a means of generating electrical energy, by employing the waves in making electrons move.

Progress in man's command of natural forces has been made by learning how to direct and control the motion of masses—in other words, by acquiring a knowledge of mechanics; progress in the future will consist in acquiring the power to control and direct the motions of electrons. This has already been largely achieved by electric contrivances; it is, however, only by the use of concrete ideas regarding the "material" used, viz., electricity, that the progress of invention and discovery can be hastened.